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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/976,440	11/25/1997	DAVID B. SMITH	MUR-3494	1889

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EXAMINER
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MOSKOWITZ, NELSON

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

08/976,440

Applicant(s)

SMITH, DAVID B.

Examiner

Nelson Moskowitz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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1. The request received on February 11, 2004 for a Continued Examination (RCE) under 37 CFR 1.114 is acceptable and a RCE has been established. Applicants' letter received on February 11, 2004 has been made of record. The amendments have been entered and the arguments considered. An action on the merits follows.

2. The text of those section of Title 35 U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-6 and 8-13 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Montgomery ('908) or Bockhorst et al when taken with Grossman and Close et al or Arriens.

In determining obviousness, the following factual determinations are made:

- a. First, the scope and content of the prior art.
- b. Second, the difference between the prior art and the pending claims.
- c. Third, the level of skill of a person of ordinary skill in this art;
- d. Fourth, whether other objective evidence may be present, which indicates obviousness or nonobviousness. See, e.g., *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ2d 1614, 1616 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 282 US 1, 17-18, USPQ 456, 466-67 (1966)).

Objective evidence includes a long felt but unmet need for the claimed invention, failure of others to solve the problem addressed by the claimed invention, imitation or copying of the claimed invention, and commercial success due to the features of the invention and not other factors. See e.g., *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 Fed. 1573, 1574-76, 222 USPQ 744, 745-747 (Fed. Cir. 1984).

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Examining the scope and content of the prior art we find the following:

a) Montgomery and Bockhorst et al disclose a method and apparatus for transmitting data in a borehole. Column 1 of Bockhorst et al and column 2 of Montgomery present numerous examples of prior art usage of sonic signal transmission of signals over drill strings. These signals are noted to be transmitted either during drilling or during pauses in the drilling operation. Montgomery specifically teaches that the transmission of data by way of vibrations in the drill string was developed to overcome some of the problems with transmission through drilling mud, hardwire, or through the earth.

In Montgomery pressure transducer 707 provides an electrical signal representative of downhole pressure. Transducer 40 then converts the electrical signals to sonic signals generated along the pipe string. The sonic signals then pass uphole past any solid physical obstruction in the well and are converted by uphole transducer 23 to electrical signals. However, no data is stored uphole. It is noted that this reference also discloses the use of microprocessor (704) downhole.

This system of sonic data transmission is noted to be superior to conventional hardwired and electromagnetic transmission, as they require complex hardware (Montgomery at column 1, lines 67-68 and column 2, lines 1-14).

In Bockhorst et al bore hole pressure data is logged and acoustically transmitted uphole along the drill string. See, especially columns 1, 3 and 4.

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b). Grossman teaches:

i) Downhole pressure data storage (pages 2 and 3); and

ii) pick-up coupling for data retrieval (overshot device).

Close et al is representative of modern borehole logging of pressure, and downhole data storage. Arriens et al shows recording the data uphole prior to transmission to the earth's surface.

In addition, Applicant has agreed that downhole data logging and storage are known in the prior art as is inductive coupling to a retrieval tool. The problem of shut-in valve blockage is set forth as conventional (amendment, page 4).

Secondly, under Deere, the difference between this prior art and the pending claims lies in the combination of acoustic uphole data transmission over a section of a section of the borehole tube shorter than the entire tube, with recording of data at the acoustic receiver prior to pick-up tool transmission.

Third, under Deere, one skilled in this art generally has a graduate degree in geophysics and over seven (7) years of experience. One need only to look at the articles in any issue of Geophysics and Geophysical Prospecting, the leading journals in this field, to realize the technical complexity of this field and the amount of graduate school study and field experience necessary to be considered skilled in this art.

To date the only secondary considerations (objective evidence) presented are the negative results of Applicant's Internet search for references concerning the use of acoustic data

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transmission through drill strings. While such negative results are considered, they do not show the extent or specifics of Applicant's search, and such search results do not outweigh the probative value of the express teachings of Montgomery and Bockhorst of sonic signal transmission over drill strings.

Applicant's argument that the use of such acoustic data transmission can not be said to have been conventional at the priority date of the present invention and, has not become conventional in the subsequent period, is irrelevant. Unconventionality of a claim limitation does not connote unobviousness, and is not a factor in the test of obviousness under 35 U.S.C. 103.

While MPT may have become better accepted in this industry, it is not a panacea as it suffers from low signal rates, substantial noise in LWD operation, and mechanical jamming problems.

The University of Texas article, the Haliburton brochure and the Moss patent cited by Applicant fail to discuss the teachings of Montgomery or Bockhorst and as such appear not to be in possession of the prior art which teaches the operable modes of sonic signaling through drill strings. While drill strings present a less than perfect medium for sonic signal transmission, even Applicant's University of Texas article states they have the potential to do so and some problems must be overcome. There is no statement of inoperability.

Applicant's amendment to claim 1 does not provide an unobvious claim limitation. Merely signaling over a distance less than that of the entire tubular string would clearly provide

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less noise, greater signal amplitude, and improved signal recognition. This occurs as the shorter tube has less signal attenuation, less noise from the surrounding earth media and drill collars. In addition, the signal would be more easily detected as its characteristics as it would encounter less interfering noise.

Furthermore, as regards the Haliburton advertisement, this article was designed to sell Haliburton's tubing system and its probative value is minimal. In addition, it fails to address the teachings of Montgomery and Bockhorst.

The Moss patent also fails to bolster Applicant's argument as it discusses the "commercialization of a system that uses the drill string for data transmission". While evidence of commercial success of the claimed invention is probative of "obviousness", commercialization per se is not the test for obviousness under 35 U.S.C. 103. In addition, Moss fails to address the teachings of Montgomery and Bockhorst.

Therefore, as the prior art shows the uphole recordation of the received pressure data to be standard, as is the sonic signal transmission along the pipe, the combination would have been obviousness to one skilled in this art.

4. Applicant's arguments have again been considered and are not convincing. First of all, the references must be considered as an ordinary skilled artisan would consider them. See In re Jacoby, 209 F. 2nd 513, 135 USPQ 317, 319 (CCPA 1962) (obviousness question cannot be approached on basis that skilled artisans would only know what they read in the references; such artisans must be presumed to know something about the art apart from what the references

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disclose); In re Bozek, 416 F. 2nd 1385, 1390, 163 USPQ 545, 549 (CCPA 1969) (conclusion of obviousness may be made “from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion on a particular reference”).

Applicant’s strenuous denial that sonic signal transmission along a pipe is conventional, is noted. However, the prior art of record does not support this denial. As set forth above, column 1 of Bockhorst et al and column 2 of Montgomery present numerous examples of prior art usage of sonic signal transmission of signals over drill strings. These signals are noted to be transmitted either during drilling (when extreme noise conditions exist) or during pauses in the drilling operation. While mud pulse signaling may be more common sonic signal transmission over drill pipes was, and is, being used.

It is also noted that Applicant admits that there have been numerous proposals in the prior art for sonic signal transmission along drill strings, but asserts that they have not been successfully implemented in practice and are not widely used. First, there is no evidence of record to support this allegation. Second, the aforesaid prior art teaches that their systems for sonic communication along a drill string were “successful” in operation and an improvement over the prior art.

In addition, the aforesaid prior art discloses operable sonic signal transmission along drill strings when operating in MWD or LWD operations. Since the signal transmission system operates successfully in such extremely noisy environments, it will clearly operate when no MWD or LWD are taking place.



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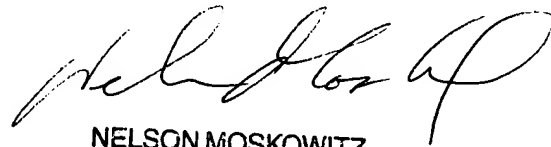
Furthermore, Applicant's claimed invention fails to clearly recite that his invention operates over a short section of tubing, thus making it much easier to transmit signals with less attenuation and interference than for longer strings as used by the applied references.

In response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. The Federal Circuit reasons in Para-Ordnance Mfg. v. SGS Importers Int'l Inc., 73 F.3d 1085, 1088-89, 37 USPQ2d 1237, 1239-40 (Fed. Cir. 1995), that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem and who had before him in his workshop the prior art, would have reasonably expected to use the solution that is claimed by Applicant. As the problem of electrical signal blockage due to shut-in valves was in the prior art, an artisan faced with this problem would turn to modes of transmission which are not blocked by the valve to form a bridge. As acoustic signal data transmission in a borehole is well known in the prior art, and described by the first cited references, the artisan would employ this mode of signal propagation to form the bridge and thereby cure his problem. Therefore, the answer in the present case is yes. This provides the motivation of the artisan, contrary to Applicant's assertion that there is no motivation to combine the references.

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Furthermore, Applicant's contention that transmission of an acoustic signal over a drill string would bypass obstructions in the drill string. This statement is contrary to common knowledge that an obstructed drill string will severely attenuate the acoustic signals traveling therein.

Finally, Applicant has added the new claim limitation of "wherein a distance between said first and second locations is short in comparison with the distance between said second location and a surface end of the borehole". This limitation is met by practically all borehole logging tools as the downhole distance of the borehole logger, is at considerable depths for hydrocarbon logging, while the transducers are only spaced about 2 localized impediments in the borehole.



NELSON MOSKOWITZ  
PRIMARY EXAMINER